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COCKLE SHELL : A POTENTIAL PARTIAL COARSE AGGREGATE REPLACEMENT IN CONCRETE

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Abstract. Effort towards preserving natural coarse aggregate for future generation and reducing cockle shell waste originating from the fisheries industry has initiated studies on possibility of integrating this waste in concrete production. This paper presents the result on the workability and compressive strength of concrete containing various percentage of cockle shell content as partial coarse aggregate replacement. Concrete mixes containing 0%, 5%, 10%, 15%, 20%, 25% and 30% cockle shell replacement level were cast before subjected to water curing for 28 days. Workability test and compressive strength test were conducted in accordance to BSEN 12350 and BSEN 12390 respectively. Results show that replacement of appropriate cockle shell content able to produce workable concrete with satisfactory strength. Integration of 20% cockle shell enhanced the strength of concrete making it to be the highest as compared to any other replacement level.

Keywords: cockle shell, partial coarse aggregate replacement, concrete, workability, compressive strength.

Introduction

Research towards producing a new concrete material stems out from two factors presented by two different industries in Malaysia that is the growing need of construction trade and by-product of cockle shell trade. The continuously growing construction industry has posed the possibility on depletion of natural aggregates in the future that would increase the cost of concrete material. This fact has been addressed Alshahwany [1] who highlighted that the natural resource decrease while the demand for aggregate to be used in concrete production is still high. Anticipating this issue, various types of waste materials have been investigated their potential to be used as partial coarse aggregate replacement material in concrete production such as oil palm shell [2], periwinkle shell [3], recycled coarse aggregate [4] and others. However, to the best of author's knowledge no work has been reported on the use of cockle shells as partial coarse aggregate replacement in concrete.